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Relationships Between GABRA2, Alcohol, and Peer Deviance

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Relationships Between *GABRA2*, Alcohol Consumption, and Peer Deviance

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INTRODUCTION

The aim of this study is to measure the association between the frequency of alcohol use and the *GABRA2* gene, as well as the potential moderating effect of peer deviance in college freshmen at Virginia Commonwealth University (VCU). This study is important because it could reveal how influential ones peers can be on future alcohol use disorders, and if variation in *GABRA2* makes one more susceptible to alcohol related disorders than the general population. A similar study from *Psychiatric Genetics* tested for the susceptibility of alcohol dependence and association with *GABRA2* by examining six SNPs on *GABRA2* in German alcohol dependent patients against a control group of healthy individuals.[1] These studies are important building blocks for the creation of preventative programs and early recognition. The more that is understood about the genetic and environmental risk factors for alcoholism, the better they can be prevented or controlled for.

BACKGROUND

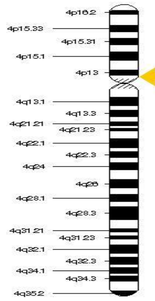
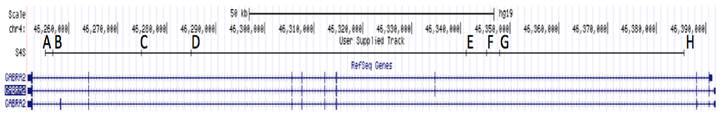


Figure 1. *GABRA2* Gene Site[2]

GABRA2 (gamma-aminobutyric acid (GABA) A receptor, alpha 2) is a gene located on chromosome 4 that codes for proteins and is associated with dependence, addiction, and neurotransmission activity.[2]

Figure 2: 8 SNPs (A-H) tested on *GABRA2*

	Name	Position
A	rs3113346	46255176
B	rs3822051	46256712
C	rs2439209	46274771
D	rs558111	46284923
E	rs17537359	46341106
F	rs4695148	46345219
G	rs116039536	46347931
H	rs16859354	46385578



Objectives:

❖**Test 8 SNPs in *GABRA2* for association with alcohol consumption frequency.**

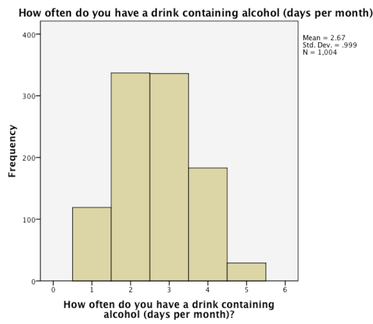
❖**Test for moderation of the association between *GABRA2* and alcohol use frequency as a function of peer deviance.**

METHODS

Eight single nucleotide polymorphisms (SNPs), or variations in single base pairs in DNA sequences, in the *GABRA2* gene were chosen to be tested for association with alcohol use frequency. VCU freshmen in Spring 2011 voluntarily answered a series of questions about the level of peer deviance in their high school and college friends, along with their frequency in alcohol use in the past 30 days. A peer deviance sum score was created from the following questions: "How many of your friends have ever done the following: smoked cigarettes, got drunk, had problems with alcohol, drunk alcohol, been in trouble with the law, or smoked marijuana?", with the options none, a few, some, most, and all.. Alcohol frequency was measured by asking, "How often do you have a drink containing alcohol?", with response options of never, monthly or less, 2-4 times a month, 2-3 times a week and 4 or more times a week. Linear regression analysis of the results from a sample of 786 eligible participants was used to determine the relationship between the variables. DNA samples were gathered by voluntary spit donations from survey participants and genotyped on Affymetrix Axiom Biobank Arrays.

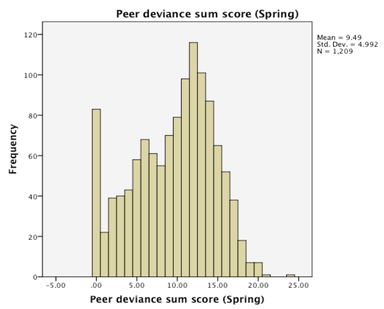
RESULTS

Figure 4: Alcohol drinking frequency



1= never, 2=monthly or less, 3=2-4 times a month, 4=2-3 times a week and 5= 4 or more times a week

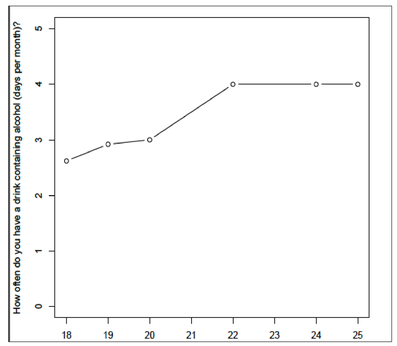
Figure 3: Peer deviance sum score (Spring 2011)



RESULTS

The regression analysis results show zero correlation between *GABRA2* genotypes and the frequency of alcohol consumption. There was also no moderating effect of peer deviance on the relationship between alcohol use and *GABRA2* variation. However, when testing for the covariates we found that age was statistically significant in that the older participants consumed higher levels of alcohol.

Figure 5: Age vs. amount of drinks in a month



CONCLUSIONS

Although the results did not show a significant correlation, further genotype testing using older participants or different SNPs should be done in order to investigate the effects of *GABRA2* variation on alcohol consumption as well as peer deviance as a potential moderating effect.

In the literature, the *GABRA2* gene is associated with more harsh alcohol use and disorders such as alcohol dependence, as was outlined in the German alcohol dependent studies conducted by researchers at the University of Mainz.[1]

Our sample consists of individuals that are typically under legal drinking age, thereby limiting access to more severe alcohol related outcomes.

Our study is among the first to examine this relationship of *GABRA2* variation and alcohol consumption frequency in college-aged students transitioning to adulthood.

REFERENCES

[1] Fehr, C., Sander, T., Tadic, A.,Lenzen,K., Anghelescu, I., Kalawo, C., Dehmer, N., Schmidt, L. & Szegedi, A. (2006) . [1]De[1]Department of Psychiatry, University of Mainz, Mainz *Gene Mapping Center, Max-Delbrueck-Centrum, Department of Psychiatry and Psychotherapy, Charité, University Medicine, CBF, Berlin, Department of Neurology, Krankenhaus der Barmherzigen Brüder, Trier, Germany, Global Clinical Development, Organon Inc., Roseland, New Jersey USA partment of Psychiatry and Psychotherapy, Charité, University Medicine, CBF, Berlin, Department of Neurology, Krankenhaus der Barmherzigen Brüder, Trier, Germany, & Global Clinical Development, Organon Inc., Roseland, New Jersey, USA. Vol. 16(1).9-17.*

[2]*Gene Cards*. Weizmann Institute of Science, n.d. Web. 02 Apr. 2014.

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Spit for Science participants